

(12) UK Patent Application (19) GB (11) 2 376 415 (13) A

(43) Date of A Publication 18.12.2002

(21) Application No 0114181.1

(22) Date of Filing 12.06.2001

(71) Applicant(s)

Hunleigh Technology PLC
(incorporated in the United Kingdom)
310-312 Dallow Road, LUTON,
Bedfordshire, LU1 1TD, United Kingdom

(72) Inventor(s)

Rolf Schild

(74) Agent and/or Address for Service

Shalini Thaker
Group IPR Department,
Hunleigh Technology PLC,
310-312 Dallow Road, LUTON,
Bedfordshire, LU1 1TD, United Kingdom

(51) INT CL⁷
A61H 1/02 1/00

(52) UK CL (Edition T)
A5R RFB RX5

(56) Documents Cited

| | |
|-------------------|---------------|
| GB 2327888 A | GB 2265314 A |
| GB 1481125 A | EP 0363037 A1 |
| WO 1995/013718 A1 | US 4986260 A |
| US 4355632 A | US 4266298 A |

(58) Field of Search

UK CL (Edition T) A5R RBE RBP REQ REYX RFB
INT CL⁷ A61F 5/32 5/34 13/06, A61H 1/00 1/02
Other: Online: EPODOC, JAPIO, WIPI

(54) Abstract Title

Inflatable pad having restrictively interconnected bladder sections for stimulating blood flow via dorsal & plantar flexion of the foot

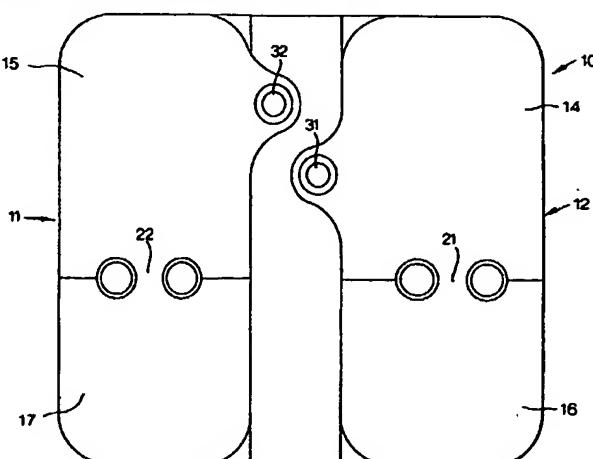
(57) An inflatable pad (10) comprises at least one bladder (11) to engage the sole of a foot and is divided into two sections (15, 17) which are interconnected by means of a restrictor (22).

Use of this apparatus involves dorsal and plantar flexion of the foot, which mimics the walking action. This improves blood circulation in the legs and prevents the formation of thrombi which is a risk to a person who has been confined to bed or a sitting position for extended periods of time.

The pad 10 is formed from two superposed sheets of plastics material (preferably vapour permeable material) and defines bladders 11 and 12. Apertures 31 and 32 are provided on the pad for inflation, for example, by mouth or pump.

In use, the two bladders 11, 12 are partially inflated and the apertures closed. The pad 10 is placed on the ground in front of the user's chair and the heels of the feet of the user placed over bladder sections 14, 15. The heels are pressed against the pad 10 and the air from bladder sections 14, 15 is pushed into bladder sections 16, 17 via restrictors 21, 22 such that the fronts of the feet are lifted. The user then presses down on sections 16, 17 to push the air back into sections 14, 15 and the cycle continues. The cycle is carried out as long as the user is seated. The pad 10 may be held in place by suitable securing means (not shown), preferably cushioned securing means for securing the pad onto the foot or feet.

Fig.1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

GB 2 376 415 A

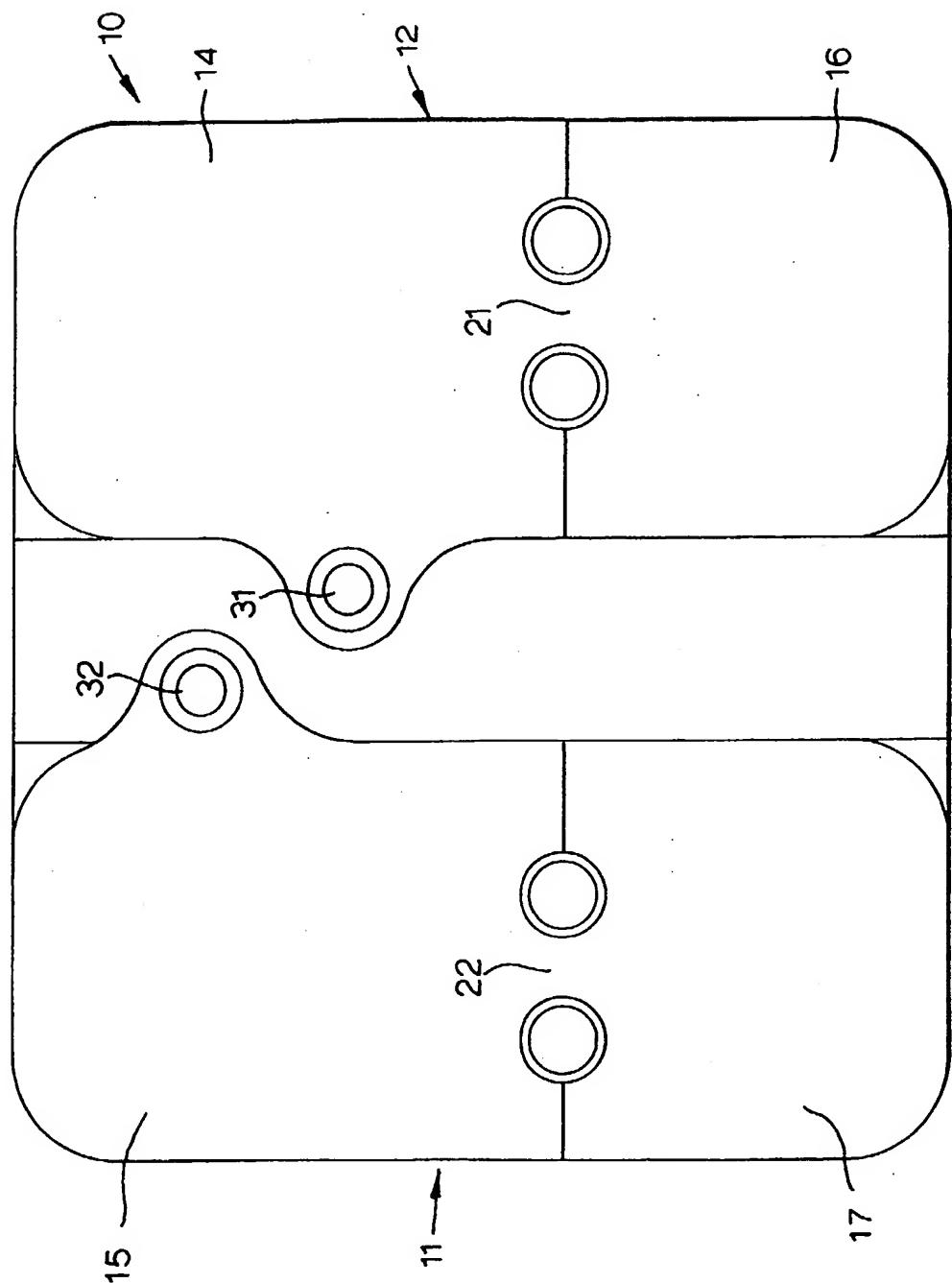


Fig. 1.

APPARATUS FOR STIMULATING BLOOD FLOW

This invention relates to apparatus to improve the circulation in the legs of a person sitting for long periods of time.

When a person stands, sits or lies for long periods without any movement, the velocity of blood flow in the person's extremities, particularly the legs, markedly decreases. Such a decrease or stasis of blood is particularly pronounced during surgery, immediately after surgery, and when a patient has been confined to bed or in a sitting position for extended periods of time. It is also known that stasis of blood is a significant cause leading to the formation of thrombi in a person's extremities, which may have a severe deleterious effect on the person, including death.

The present invention provides a leg exercising apparatus which enables a patient to exercise his or her leg muscles from a prone or seated position by dorsal and plantar flexion, thus imitating the muscular actions involved in normal walking. It has also been shown that the arch of the foot houses a large venous plexus which normally is compressed by means of the dorsal and plantar flexion of the foot during walking or running thereby stimulating circulation.

According to the present invention, there is provided an inflatable pad comprising at least one bladder to engage substantially the whole of the sole of the foot, the bladder divided into two sections interconnected by means of a restrictor, one section underlying the heel area of the foot and interconnected to the other section underlying the front of the foot, means to allow partial

inflation of the bladder and means to retain the air within the bladder.

Preferably, the bladder is part of a pair located side by side on an inflatable pad. Preferably, the bladder is made from vapour permeable material. Preferably, there are provided means for locating and securement of the bladder or pad on the foot or feet respectively, and more preferably the securement means include cushioning, for comfort.

10 In use, a person partially inflates the two bladders and then places the pad on the floor in front of where he is about to sit. Both feet are placed upon each respective bladder, the heels on top of the rear inflated bladder sections. The person presses down on the heels and pushes 15 the air into the front section of the bladder thereby raising the front of the foot. The section underlying the heel is deflated and the heel lowered. The front of the foot is then pressed against the bladder and air is transferred back to the heel bladder and the action 20 continues. In this way the foot is made to flex. This dorsal and plantar flexion mimics the walking action and the pressure exerted also uses the calf muscles, the combination ensuring that venous velocity is maintained and preventing the formation of thrombi.

25 An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figures 1 shows a plan view of a pair of bladders according to the invention.

30 Referring to Figure 1, a pad 10 is formed from two superposed sheets of plastics material high frequency welded together at their peripheries and internally in a pattern defining the bladders 11 and 12. Conveniently, the

high frequency weld can be replaced by other available means of joining the materials, for example, ultrasonic welding, heat sealing or by adhesive bonding.

Apertures 31 and 32 are provided on the material for inflation, for example, by mouth or pump.

In use, the two bladders 11, 12 are partially inflated and the apertures closed. The amount of inflation may be adjusted to the weight of the person using the pad 10. The pad 10 is placed on the ground in front of the user's chair and the heels of the feet of the user placed over bladder sections 14, 15. The heels are pressed against the pad 10 and the air from bladder sections 14, 15 is pushed into bladder sections 16, 17 via restrictors 21, 22 such that the fronts of the feet are lifted. The user then presses down on sections 16, 17 to push the air back into sections 14, 15 and the cycle continues. The cycle is carried out as long as the user is seated. The user may press both heel sections simultaneously or alternately, whichever is comfortable.

The pad 10 may be held in place by suitable securing means, (not shown) preferably cushioned.

The pad can be used during any prolonged sitting, for example, on journeys, in public places or at home and can be recommended for continual use to provide continual prophylaxis since it can be used wherever the person is sitting, for simultaneous stimulation of the venous blood flow. The pad may also be used whilst wearing elasticated stockings for enhanced venous stimulation.

CLAIMS:

1. An inflatable pad comprising at least one bladder to engage substantially the whole of the sole of a foot, the bladder divided into two sections interconnected by means of a restrictor, one section to accommodate the heel area of a foot and interconnected to the other section for the front of the foot, means to allow partial inflation of the bladder and means to retain the air within the bladder.

10

2. An inflatable pad as claimed in claim 1 wherein the bladder is part of a pair of bladders located side by side on the inflatable pad.

15 3. An inflatable pad as claimed in claims 1 or 2 wherein the bladder(s) is made from vapour permeable material.

4. An inflatable pad as claimed in claims 1, 2 or 3 wherein there are provided means for locating and securing 20 the pad onto the foot or feet.

5. An inflatable pad as claimed in claim 4 wherein the securement means include cushioning, for comfort.

25 6. An inflatable pad substantially as herein described and with reference to the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0114181.1
Claims searched: 1-6

Examiner: Stephen Quick
Date of search: 13 February 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): ASR (RBE, RBP, REQ, REYX, RFB)

Int Cl (Ed. 7): A61F 5/32, 5/34, 13/06; A61H 1/00, 1/02

Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|--|--------------------|
| A | GB 2327888 A (HUNTLEIGH TECHNOLOGY), see figure 1a | - |
| X | GB 2265314 A (SOUTH GLAMORGAN HEALTH AUTHORITY), see figure 1 (laid-flat form) and pages 2 (lines 16-21), 3 (lines 13-14 & 19-23) & 5 (lines 11-21); bladder sections 14 connected by restrictive passageways | 1-3 |
| X | GB 1481125 A (AKTIEBOLAGET METEVE), see figures 1 & 2 and page 2 lines 15-65; bladder sections 4 connected by restricting one-way valves 5 | 1 & 2 |
| X | EP 0363037 A1 (SAFEGUARD INDUSTRIAL), see figure 1 (laid-flat form) and columns 2 (lines 54-end), 3 (lines 1-2 & 31-36), 4 (lines 40-51), 5 (lines 19-25); bladder sections 4 connected by restrictive passageways | 1 & 2 |
| A | WO 95/13718 A1 (ENGROS-SCHUHHAUS), see figure 3 (cavities 28 & 30) and page 5 line 1 to page 6 line 4 | - |
| X | US 4986260 A (SUPERSPINE), see figure 1; bladder sections 12a & 14a connected by restrictive line 68 | 1 & 2 |

- X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

- A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



INVESTOR IN PEOPLE

Application No: GB 0114181.1
Claims searched: 1-6

Examiner: Stephen Quick
Date of search: 13 February 2002

| Category | Identity of document and relevant passage | | Relevant to claims |
|----------|---|--|--------------------|
| X | US 4355632 A | (JOBST INSTITUTE), see especially figure 1 (laid-flat form) and columns 3 (lines 25-45 & 50-54) & 4 (lines 32-39); bladder sections 60, 62 & 64 formed by partial restrictions L" or connected by restrictive valve 66 | 1, 2 & 4 |
| X | US 4266298 A | (MARLENE S MINDEY), see figure 2 (laid-flat form) and columns 2 (lines 18-34) & 3 (lines 29-37); bladder sections formed by partial restrictions 16 | 1 & 2 |

| | | | |
|---|---|---|--|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |